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REVIEW OF FUTURE CONSTRUCTION & IMPROVEMENT NEEDS FOR FEDERAL AID SECONDARY ROADS IN LEWIS & CLARK COUNTY MONTANA

1967 – 1986

MONTANA STATE HIGHWAY COMMISSION
PLANNING SURVEY SECTION
IN COOPERATION WITH
BUREAU OF PUBLIC ROADS

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C O N T E N T S

Situation Map

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Procedure

Conclusion

Standard Sheet No. 31

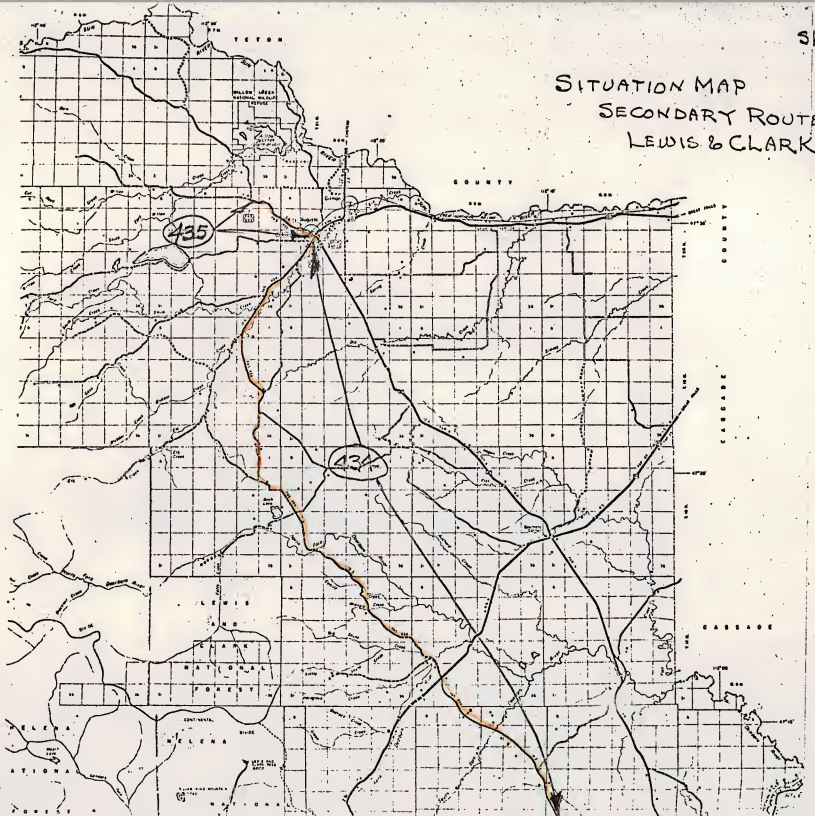
Tabulation - 20 Year Improvement Needs

Route Situation Maps and Cost Estimate Data

Sheet 1 of 2

SITUATION MAP
SECONDARY ROUTES
LEWIS & CLARK COUNTY

SITUATION MAP
SECONDARY ROUTES
LEWIS & CLARK COUNTY.



INTRODUCTION

This is a brief study of rural roads in Lewis and Clark County, which are now a part of the Federal Aid Secondary Highway System of Montana.

The purpose of the study is to determine the future construction and improvement expenditures necessary to make the roads, now on the Secondary System, in Lewis and Clark County reasonably adequate and to establish a balanced, beneficial 20 year program for making the needed improvements.

PROCEDURE

Each Secondary route in Lewis and Clark County was appraised section-by-section with regard to culture, terrain, and pertinent highway elements, such as, curvature, grade, width, surface, safety and traffic volume. Sufficiency ratings were determined for each section on the basis of point values set up for each of the pertinent elements noted. Such ratings show the relative adequacy of any given section of Secondary Highway as compared with a top rating of 100 points assigned to a section judged to be entirely adequate, efficient, economical and safe. Sections of highway having a sufficiency rating of less than 60 are considered to be providing less than adequate service and sections rating less than 50 are considered critical. Priority of improvement is also indicated by sufficiency ratings.

The design standards, which are followed to construct a new highway, dictate the structural adequacy, safety and service to be expected. They,

of course, also determine the kind and extent of improvement needed when inadequacies exist. Standards recently adopted by the Montana Highway Commission for Primary and Secondary Highways are shown on Standard Sheet No. 31. These new standards add from 2 to 6 feet to the shoulder width of standards previously used on completed Secondary Highways. Incidentally, lack of shoulders is the most common deficiency of existing highways in Montana. Secondary roads with low traffic volumes, say less than 150 vehicles ADT in 1987, are considered adequate for this study if they have a minimum width of 24 feet shoulder to shoulder.

Cost estimates are based upon average per mile costs for Secondary roads constructed during the last two years. Percentages of these costs are used for upgrading existing roads in consideration of likely "salvage". The total estimated costs include estimates of grading, base and surfacing, structures, right-of-way and utilities. Features other than right-of-way include 10% for engineering.

Situation maps for each route, showing the section-by-section estimates, are attached to this report. The pertinent results of the study are shown in the summary tabulation of the sections according to programs and in order of priority.

CONCLUSION

Approximately 8½ million dollars are needed during the next 20 years to improve Secondary roads in Lewis and Clark County to acceptable standards. On an annual basis, this need is more than twice the current annual allocation of Federal and State funds for Secondary roads in Lewis and

Clark County. Although mounting concern about these needs will surely cause the available funds to be increased substantially in the future, it is not conceivable that they will be doubled very soon, if ever.

It is, therefore, rather obvious that the specific programs outlined in this study, as being necessary to make all Secondary roads in Lewis and Clark County reasonably adequate according to a balanced and beneficial schedule, will not be accomplished. However, the study provides much basic factual data, which should be useful in future considerations associated with Secondary Road Programing in Lewis and Clark County.

Drawn Nov. 1, 1966	Last Revision	STANDARD SHEET NO. 31
State Highway Commission Helena, Montana	PRIMARY & SECONDARY DESIGN STANDARDS	Approved Paul W. Johnson State Highway Engineer

MINIMUM VERTICAL CURVE LENGTHS*

Terrain		Level	Rolling	Mountain
Design Speed		70 mph	60 mph	50 mph
STOPPING SIGHT DISTANCE	Stopping Distance, ft.	600	475	350
	Crest Vertical Curve	2.55	1.60	0.85
	Sag Vertical Curve	1.45	1.05	0.75
PASSING SIGHT DISTANCE	Passing Distance, ft.	2300	2000	1700
	Crest Vertical Curve	16.10	12.10	8.70

*Values given are coefficient by which the algebraic difference in grade may be multiplied to determine the length in sta's of the vert. curve which will provide minimum sight distance. Special design where higher standards are not feasible. Subject to prior app. of headquarters.

MAXIMUM GRADES & HORIZONTAL CURVES

	Level Terrain Design Speed 70 mph	Rolling Terrain Design Speed 60 mph	Mountain Terrain Design Speed 50 mph	Special Design @
Maximum Grade	3%	5%	6%	7%
Max. Horiz. Curve	3°30'	5°00'	7°30'	12°30'

@Special design where higher stds. are not feasible. Subject to prior approval of headquarters.

ROAD WIDTHS

Future ADT * 20 yr.	PRIMARY & SECONDARY MINIMUM WIDTHS		
	Mountainous 50 mph	Rolling 60 mph	Level 70 mph
0-50	26	26	26
50-250	28	28	28
250-400	28	30	30
400-750	34	34	36
750-2800	40	40	40
Over 2800	44	44	44

Primary & Secondary Roads with future traffic volumes of 100 ADT or more to be Bit. Surf. Low volume roads are considered to be those having less that 100 ADT future traffic counts.

*In some cases, traffic volume may be given as design hourly volume (DHV) in such cases DHV X 7 = ADT

NOTE: Refer to Std. Sht. #20 for super elevations and curve widening.

See Std. Sht. #30 or #32 for Interstate standards.

20 Year Improvement Needs

Lewis and Clark County — Secondary Roads

Section Tabulations According to Priority of Need on Basis of Sufficiency Ratings

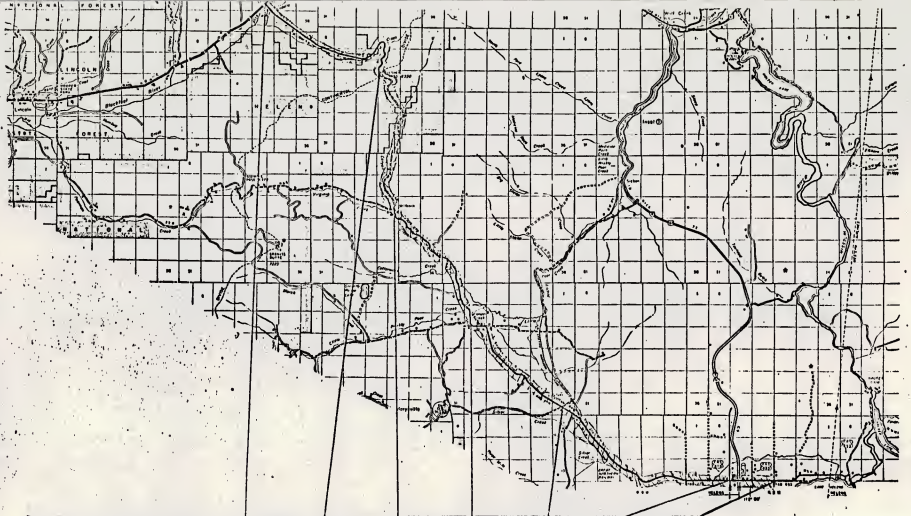
Five Year Period 1967-1971

Priority No	Route	Section	Sufficiency Rating	Length Miles	Improvement Cost
1	284	Canyon Ferry Dam East	43	6.8	$ 860,000
2	454	Brewery Theatre South	45	0.5	99,000
3	280	7 Mi E of Helena to Lakeside	48	7.0	613,000
4	279	Wilborn to Flesher Pass	60	8.3	271,000
		Total for Period		22.6	$1,843,000
Five Year Period 1972-1976					
5	280	Lakeside to York	61	5.0	$1,262,000
6	434	Dearborn River Crossing	65	3.0	684,000
7	279	Jct FAP3 8 Mi N Helena West	66	9.1	444,000
		Total for Period		17.1	$2,390,000
Ten Year Period 1977-1986					
8	280	I 15 Over Pass East	69	5.9	$ 372,000
9	284	Clarksoil to Canyon Ferry Dam	71	8.7	420,000
10	356	Jct FAP 8 W of Helena North	73	1.0	142,000
11	279	Jct Marysville Rd to Canyon Ck Store	73	5.7	341,000
12	356	Military Reservation North	75	3.8	228,000
13	435	Augusta - Willow Creek	77	3.6	246,000
14	355	Fairgrounds Road	78	1.6	81,000
15	433	East Helena North	78	4.0	142,000
16	434	Bean Lake North	79	9.1	764,000
17	434	Steans to Bean Lake	80	7.0	415,000
18	356	Ft Harrison Road North	81	1.1	48,000
19	454	Unionville Road	83	3.5	90,000
20	434	Wolf Creek North	83	17.8	499,000
21	434	Augusta West	85	9.8	255,000
22	452	Masonic Home Road	85	2.4	60,000
23	453	Hauser Lake Road Road W	85	3.4	85,000
24	279	Canyon Creek Store N	90	7.2	0
25	280	I-15 Overpass W	91	1.0	0
26	481	East Helena Loop	95	1.7	0
27	518	Permanente Road	95	1.4	0
28	279	I-15 Interchange E & W	98	2.3	0
29	279	Flesher Pass North	98	8.2	0
		Total for Period		110.2	$4,188,000

Total For 20 Year Period 149.9 Miles $8,421,000

Average Annual Need $421,050

Present Annual Program $170,000



SECTION PRIORITY NO	29	4	24	11	7	28
LENGTH (MILES)	8.2	8.3	7.2	5.1	9.1	2.3
FINANCIAL DIST.	7	7	7	7	7	7
CLASS (RURAL-URBAN-FOREST)	RF	RF	R	R	R	R
NO. OF LANES	2	2	2	2	2	2
EXISTING ROADWAY WIDTH	24	28	28	24	24	28
SUFFICENCY RATING	58	60	90	73	65	58
DESIGN ADT 20 YEAR	170	170	220	340	400	425
NO. OF LANES & DESIGN WIDTH	2-24	2-28	2-28	2-30	2-30	2-28
TIME OF IMPROVEMENT (YEARS)	None	1971-1971	None	1971-1976	1972-1976	None
IMPROVEMENT (1) NEW (2) UP GRADE EXIST		(2)		(2)	(2)	
ESTIMATED NEEDS IN THOUSANDS						
RIGHT OF WAY		0		24	9	
UTILITIES		0		6	9	
GRADE & DRAINAGE		16		88	123	
BASE & SURFACE		220		220	207	
STRUCTURES		0		0	0	
INCIDENTALS *		35		8	6	
TOTAL COST **	0	271	0	341	444	0

* AT YEARS OF CONSTRUCTION, STABILIZATION, TRAFFIC CONTROL & MISC.
** 15% PER EACH IS INCLUDED

LEWIS and CLARK CO.

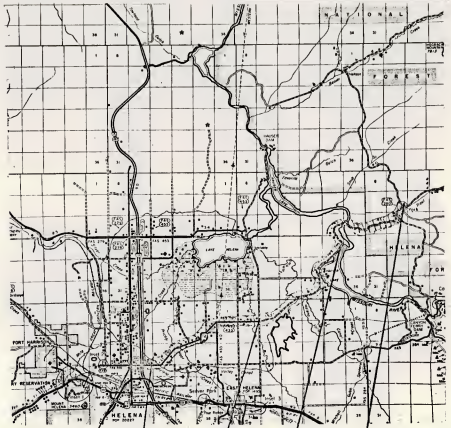
SECONDARY ROADS

F.A.S. ROUTE 279

Flesher Pass Road

40.8 Miles

20 Year Needs $ 1,056,000



SECTION PRIORITY NO	25	8	3	5
LENGTH (MILES)	1.0	5.9	7.0	5.0
FINANCIAL DIST.	7	7	7	7
CLASS (RURAL-URBAN-FOREST)	R	R	R	RF
NO. OF LANES	2	2	2	2
EXISTING ROADWAY WIDTH	28	24	20	16
SUFFICENCY RATING	91	69	48	61
DESIGN AOT 20 YEAR	1000	1000	510	250
NO. OF LANES & DESIGN WIDTH	2 - 28	2 - 40	2 - 34	2 - 28
TIME OF IMPROVEMENT (YEARS)	None	1977-1986	1961-1971	1972-1976
IMPROVEMENT (1) NEW (2) UP GRADE EXIST		(2)	(1)	(1)
ESTIMATED NEEDS IN THOUSANDS				
RIGHT OF WAY		17	21	20
UTILITIES		12	3	5
GRADE & DRAINAGE		69	260	535
BASE & SURFACE		246	326	200
STRUCTURES		25	0	500
INCIDENTALS *		3	3	2
TOTAL COST **	0	372	613	1262

* AT GRADE EX. CLEARING, SCARIFICATION, TRAFFIC CONTROL & MISC.
** 10% FOR ENGR IS INCLUDED

LEWIS and CLARK CO.

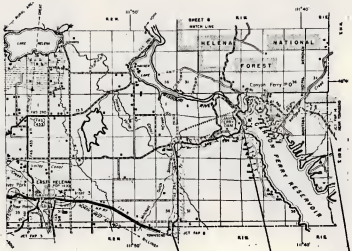
SECONDARY ROADS

F.A.S. ROUTE 280

Lakeside & York Road

18.9 Miles

20 Year Needs $ 2,247,000



SECTION PRIORITY NO	9	1
LENGTH (MILES)	8.7	6.8
FINANCIAL DIST.	F	F
CLASS (RURAL-URBAN-FOREST)	R	R
NO. OF LANES	2	2
EXISTING ROADWAY WIDTH	26	20
SUFFICENCY RATING	71	43
DESIGN ADT 20 YEAR	750	600
NO. OF LANES & DESIGN WIDTH	2 - 34	2-34
TIME OF IMPROVEMENT (YEARS)	1977-1986	1967-1971
IMPROVEMENT (1) NEW (2) UP GRADE EXIST	(2)	(2)
ESTIMATED NEEDS IN THOUSANDS		
RIGHT OF WAY	6	27
UTILITIES	0	4
GRADE & DRAINAGE	88	468
BASE & SURFACE	321	318
STRUCTURES	0	40
INCIDENTALS *	5	3
TOTAL COST **	420	860

* AT GRADE RR CROSSINGS, RECTIFICATION, TRAFFIC CONTROL & MISC.
** 10% FOR EACH IS INCLUDED

LEWIS and CLARK CO.

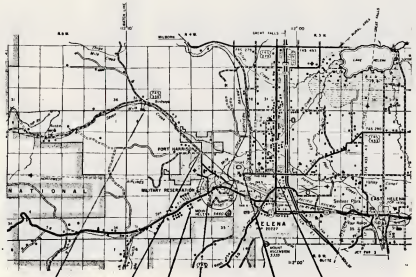
SECONDARY ROADS

F.A.S. ROUTE 284

Canyon Ferry Lake Road

15.5 Miles

20 Year Needs $ 1,280,000



SECTION PRIORITY NO	12	18	10			14
LENGTH (MILES)	3.8	1.1	1.0			1.6
FINANCIAL DIST.	7	7	7			7
CLASS (RURAL-URBAN-FOREST)	R	R	R			R
NO. OF LANES	2	2	2			2
EXISTING ROADWAY WIDTH	22	22	22			24
SUFFICENCY RATING	75	81	73			78
DESIGN ADT 20 YEAR	300	300	2300			1400
NO. OF LANES & DESIGN WIDTH	2-30	2-30	2-40			2-40
TIME OF IMPROVEMENT (YEARS)	1977-1986	1977-1986	1977-1986			1977-1986
IMPROVEMENT (1) NEW (2) UP GRADE EXIST	(2)	(2)	(2)			(2)
ESTIMATED NEEDS IN THOUSANDS						
RIGHT OF WAY	20	0	20			5
UTILITIES	10	0	10			5
GRADE & DRAINAGE	44	12	24			18
BASE & SURFACE	152	35	62			52
STRUCTURES	0	0	25			0
INCIDENTALS *	2	1	1			1
TOTAL COST **	228	48	142			81

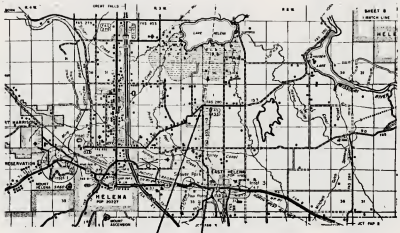
* AT GRADE, ON CROSSINGS, BEAUTIFICATION, TRAFFIC CONTROL & MISC.
** 10% FOR ENG'G IS INCLUDED

LEWIS and CLARK CO.

SECONDARY ROADS

F.A.S. ROUTES 355 1.6Mi & 356 5.9Mi

20 Year Needs $ 499,000



SECTION PRIORITY No	15
LENGTH (MILES)	4.0
FINANCIAL DIST.	7
CLASS (RURAL-URBAN-FOREST)	R
NO. OF LANES	2
EXISTING ROADWAY WIDTH	26
SUFFICENCY RATING	78
DESIGN ADT 20 YEAR	300
NO. OF LANES & DESIGN WIDTH	2 - 24
TIME OF IMPROVEMENT (YEARS)	(1971-1975)
IMPROVEMENT (1) NEW (2) UP GRADE EXIST	(2)
ESTIMATED NEEDS IN THOUSANDS	
RIGHT OF WAY	0
UTILITIES	0
GRADE & DRAINAGE	18
BASE & SURFACE	122
STRUCTURES	0
INCIDENTALS *	2
TOTAL COST **	142

* AT GRADE RR CROSSINGS, STRATIFICATION, TRAFFIC CONTROL & MISC.
** NO ITEMS FOR R/W OR ADJACENTS

LEWIS and CLARK CO.

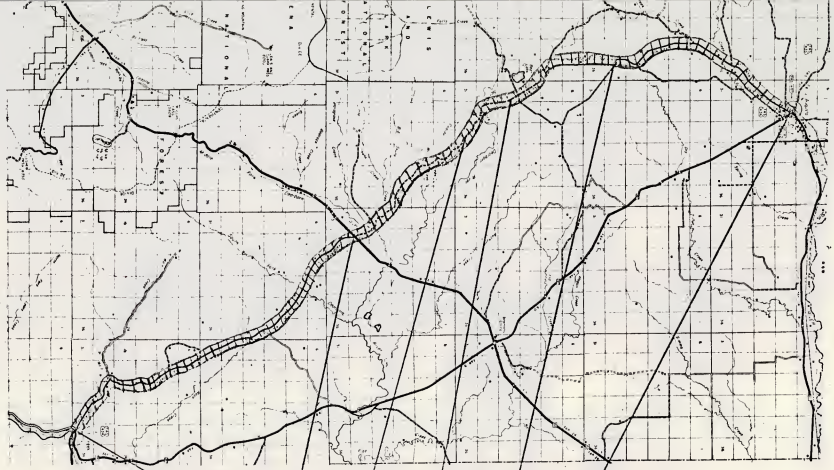
SECONDARY ROADS

F.A.S. ROUTE 433

East Helena North

4.0 Miles

20 Year Needs $ 142,000



SECTION PRIORITY NO	20	17	6	16	21
LENGTH (MILES)	17.8	7.0	3.0	9.1	9.8
FINANCIAL DIST.	7	7	7	7	7
CLASS (RURAL-URBAN-FOREST)	R	R	R	R	R
NO. OF LANES	2	2	2	2	2
EXISTING ROADWAY WIDTH	24	18	18	18	26
SUFFICENCY RATING	83	80	65	79	85
DESIGN ADT 20 YEAR	130	60	60	120	140
NO. OF LANES & DESIGN WIDTH	2 - 24	2 - 26	2 - 26	2 - 26	2 - 26
TIME OF IMPROVEMENT (YEARS)	1977-1986	1977-1986	1972-1976	1977-1986	1977-1986
IMPROVEMENT (1) NEW (2) UP GRADE EXIST	(2)	(1)	(1)	(1)	(2)
ESTIMATED NEEDS IN THOUSANDS					
RIGHT OF WAY	0	21	3	36	0
UTILITIES	0	0	0	9	0
GRADE & DRAINAGE	0	224	471	314	0
BASE & SURFACE	490	140	60	400	250
STRUCTURES	0	30	150	0	0
INCIDENTALS *	9	0	0	5	5
TOTAL COST **	499	415	684	764	255

* RIT BASED ON ENGINEERING, MONUMENTIFICATION, TRAFFIC CONTROL, & MISC.
** 10% TAX STATE TO INCLUDED

LEWIS and CLARK CO.

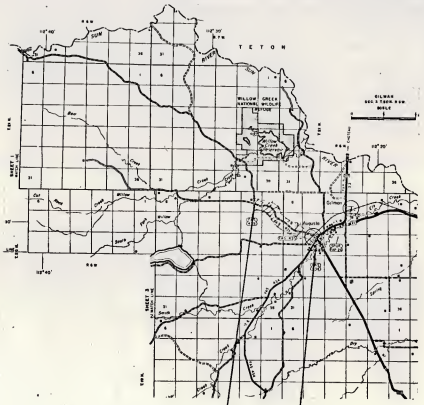
SECONDARY ROADS

F.A.S. ROUTE 434

Wolf Creek-Stearns-Augusta

46.1 Miles

20 Year Needs $ 2,617,000



SECTION PRIORITY NO	13
LENGTH (MILES)	3.6
FINANCIAL DIST.	7
CLASS (RURAL-URBAN-FOREST)	R
NO. OF LANES	2
EXISTING ROADWAY WIDTH	20
SUFFICENCY RATING	77
DESIGN ADT 20 YEAR	130
NO. OF LANES & DESIGN WIDTH	2-28
TIME OF IMPROVEMENT (YEARS)	1977-1986
IMPROVEMENT (1) NEW (2) UP GRADE EXIST	(1)
ESTIMATED NEEDS IN THOUSANDS	
RIGHT OF WAY	7
UTILITIES	1
GRADE & DRAINAGE	73
BASE & SURFACE	154
STRUCTURES	0
INCIDENTALS *	2
TOTAL COST **	246

* 8% OF GRADE AND DRAINAGE, BITUMINIZATION, TRAFFIC CONTROL & MISC.
** 10% FOR FOUR (4) YEARS

LEWIS and CLARK CO.

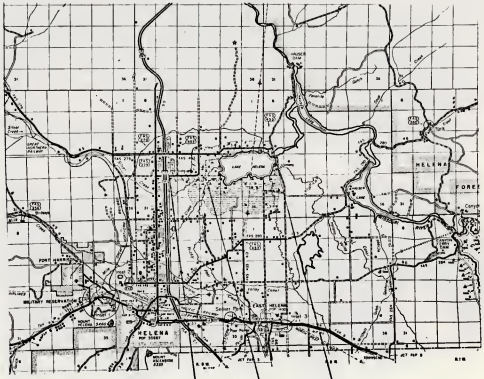
SECONDARY ROADS

F.A.S. ROUTE 435

Augusta - Willow Creek

3.6 Miles

20 Year Needs # 246,000



SECTION PRIORITY NO	2.2	2.3
LENGTH (MILES)	2.4	3.4
FINANCIAL DIST.	7	7
CLASS (RURAL-URBAN-FOREST)	R	R
NO. OF LANES	2	2
EXISTING RDADWAY WIDTH	26	26
SUFFICENCY RATING	85	85
DESIGN ADT 20 YEAR	80	60
NO. OF LANES & DESIGN WIDTH	2 - 26	2 - 26
TIME OF IMPROVEMENT (YEARS)	1977-1986	1977-1986
IMPROVEMENT (1) NEW (2) UP GRADE EXIST	(2)	(2)
ESTIMATED NEEDS IN THOUSANDS		
RIGHT OF WAY	0	0
UTILITIES	0	0
GRADE & DRAINAGE	0	0
BASE & SURFACE	60	85
STRUCTURES	0	0
INCIDENTALS *	0	0
TOTAL COST **	60	85

* AT GRADE RR CROSSINGS, IDENTIFICATION, TRAFFIC CONTROL & MISC.
** 10% FED ENG'G IS INCLUDED

LEWIS and CLARK CO.

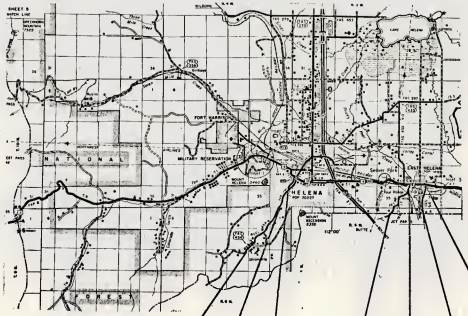
SECONDARY ROADS

F.A.S. ROUTE 453

Masonic Home Road

5.8 Miles

20 Year Needs $ 145000



SECTION PRIORITY NO	19	2	26	27
LENGTH (MILES)	3.5	0.5	1.7	1.4
FINANCIAL DIST.	7	7	7	7
CLASS (RURAL-URBAN-FOREST)	R	U	R	R
NO. OF LANES	2	2	2	2
EXISTING ROADWAY WIDTH	28	24	28	28
SUFFICENCY RATING	83	45	95	95
DESIGN ADT 20 YEAR	760	1000	150	600
NO. OF LANES & DESIGN WIDTH	2 - 28	2 - 24	2 - 28	2 - 28
TIME OF IMPROVEMENT (YEARS)	1977-1986	1967-1971	None	None
IMPROVEMENT (1) NEW (2) UP GRADE EXIST	(2)	(2)		
ESTIMATED NEEDS IN THOUSANDS				
RIGHT OF WAY	0	25		
UTILITIES	0	20		
GRADE & DRAINAGE	0	18		
BASE & SURFACE	88	36		
STRUCTURES	0	0		
INCIDENTALS *	2	1		
TOTAL COST **	90	99	0	0

* AT GRADE RR CROSSINGS, BEAUTIFICATION, TRAFFIC CONTROL, & MISC.
** 10% FOR ROW'S IS INCLUDED

LEWIS and CLARK CO.

SECONDARY ROADS

F.A.S. ROUTES 454, 481, & 518

20 Year Needs $ 189,000